Our results provide a quantitative approach for measuring smoke-related changes in the lung.

ASSOCIATION OF SERPINE2 AND OTHER COPD CANDIDATE GENES TO DIFFERENT EMPHYSEMA SUBTYPES AND LUNG FUNCTION

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Imbalance between proteases and antiproteases is believed to play an important role in lung tissue destruction leading to COPD and pulmonary emphysema. We investigated this by studying the association of several genes involved in protease-antiprotease balance to different emphysema subtypes and lung function among Finnish construction workers.
Six single nucleotide polymorphisms (SNPs) from five genes *(MMP1, MMP9, MMP12, TIMP2,* and *SERPINE2*) were analyzed from 951 clinically and radiologically characterized construction workers. The genotype and haplotype data was compared to different emphysematous signs confirmed with HRCT (centrilobular, paraceptal, panlobular, and bullae), forced vital capacity (FVC), forced expiratory volume in one second (FEV_1), maximal expiratory flow at 50% of FVC (MEF50), total lung capacity (TLC), single breath diffusing capacity for carbon monoxide (DL_{CO}), and specific diffusing capacity (DL_{CO}/VA).
The *SERPINE2* rs729631 variant allele and a haplotype consisting of variant alleles of rs729631 and rs840088 were found to predispose to pathological panlobular emphysema (OR 4.37 95% CI 1.61-11.86) **[1]**. In contrast, the *MMP9* rs3918242 variant allele was found to protect from pathological centrilobular emphysema (OR 0.53, 95% CI 0.30-0.90). The *TIMP2* rs2277698 SNP variant allele, in turn, was found to predispose to pathological paraceptal emphysema (OR 1.94, 95% CI 1.14-3.30) and decreased MEF50 ($p=0.012$).
Our findings strengthen the hypothesis of the importance of protease-antiprotease balance in development of COPD and emphysema. They also shed light on the etiology of different emphysema subtypes by suggesting associations between *SERPINE2* and panlobular emphysema, *MMP9* and centrilobular emphysema, and *TIMP2*, paraceptal emphysema and airflow obstruction.

Reference

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This study was partly supported by the Finnish Work Environment Fund and ECNIS network of excellence (Environmental Cancer Risk, Nutrition and Individual Susceptibility).

MYOCARDIAL INFARCTION AND OTHER CO-MORBIDITIES IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE: A DANISH NATIONWIDE STUDY OF 7.4 MILLION INDIVIDUALS

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Treatment and prevention of co-morbidities in patients with chronic obstructive pulmonary disease (COPD) has great potential to improve the overall prognosis of COPD patients.
We assessed the extent of myocardial infarction and other co-morbidities in individuals with COPD in the general population.
We used individual participant data for the entire Danish population from 1980 through 2006, comprising 140 million person-years of follow-up. We detected ever-diagnosed COPD (n=313,958) and incident cases of myocardial infarction (n=422,344), lung cancer (n=115,296), hip fracture (n=53,756), depression (n=91,868), and diabetes mellitus (n=290,942). Multivariate adjusted hazard ratios for life-time association with ever-diagnosed COPD were 1.26 (95% CI 1.25-1.27) for myocardial infarction, 2.05 (2.03-2.08) for lung cancer, 2.12 (2.07-2.17) for hip fracture, 1.74 (1.70-1.77) for depression, and 1.21 (1.20-1.23) for diabetes mellitus, compared with controls. Before the first hospitalisation with COPD, multivariate adjusted odds ratios were 1.47 (1.44-1.49) for myocardial infarction, 3.68 (3.52-3.84) for lung cancer, 1.16 (1.13-1.18) for hip fracture, 1.88 (1.80-1.96) for depression, and 1.16 (1.13-1.18) for diabetes mellitus, compared with matched controls. Corresponding values after a COPD hospitalisation were 0.74 (0.73-0.76), 1.48 (1.45-1.51), 1.23 (1.20-1.27), 1.21 (1.18-1.24), and 0.83 (0.81-0.85), respectively.
COPD was associated with higher rates of myocardial infarction, lung cancer, diabetes, hip fracture, and depression, but the strength of these associations were modified after a first admission for COPD. These associations may be related to common genetic and/or unsafe lifestyle/environmental risk factors, and therefore are those factors likely to have an adverse health impact rather than COPD per se.

PREDICTORS OF SPO_2 ≤95% IN A CROSS-SECTIONAL POPULATION BASED SURVEY

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Background: Pulse oximetry has become an important tool in evaluating, and monitoring pulmonary diseases. There is limited knowledge on distribution of SpO_2 values in a general population.
Aims and objectives: We wanted to determine independent predictors of low pulse oximetry values in a screened population.
Methods: A cross-sectional population based survey was performed in the city of Tromsø, Norway, in 2007-2008. Valid spirometry and pulse oximetry (SpO_2) were performed in 6320 participants aged 38-87 years (57 % women). The examinations also included questionnaires and readings for hemoglobin, C-reactive protein (CRP), pulse, weight and height. We considered resting oxygen saturation ≤ 95 as an abnormal value. Predictors of $SpO_2 \leq 95\%$ with a statistical significance of $p<0.25$ were entered into a logistic regression model. In the final model we included predictors with $p\leq0.05$.
Results: We found $SpO_2 \leq 95\%$ in 400 participants (6.3 %) and $SpO_2 \leq 92$ in 30 (0.5 %). The strongest predictors in the logistic regression ($p<0.001$) were increased BMI, reduced FEV1% predicted, and increased age, hemoglobin and CRP. Other significant predictors were current smoking ($p=0.001$) and former smoking ($p=0.037$). The following variables did not reach statistical significance; pulse, self-reported asthma, COPD, cardiovascular disease, atrial fibrillation, diabetes and hypertension, neither did pack-years, dyspnea, cough, and recent airway infection. Sex was an insignificant factor in the final model.
Conclusion: Independent predictors of $SpO_2 \leq 95\%$ in this population based survey were BMI (↑), FEV1% predicted (↓), age (↑), hemoglobin (↑), CRP (↑), and history of smoking (↑).

EXACERBATION HISTORY IN COPD PATIENTS WITH AND WITHOUT EXPIRATORY FLOW LIMITATION (EFL) MEASURED BY FORCED OSCILLOMETRY TECHNIQUE (FOT)

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Within-breath change in reactance at 5 Hz (DX5) during tidal breathing reliably detects EFL in patients with COPD[1]. We used this method to determine the presence of EFL in 268 stable COPD patients from the Bergen cohort of the Eclipse study. Our aim was to examine the association between EFL and history of exacerbations.
The Eclipse study was a multi-centre, three-year observational, non-interventional, case-control study with a total of 8 visits. For further characterization, see Agusti et al[2]. We compared the self-reported exacerbation history 12 months before visit 1 in COPD patients without EFL compared with those who experienced EFL during the duration of the study. A COPD patient with 2 or more exacerbations was defined as a frequent exacerbator.
FOT measurements were performed using a Masterscreen IOS. Within-breath reactance, DX5 was estimated as mean inspiratory X5 − mean expiratory X5 over a period of 30s, and EFL defined when the mean of 3 such measurements exceeded 0.28kPa/L/s, the threshold proposed by Dellaca et al.[1]